

WHAT IS CLAIMED IS:

1. A distributed call progress tone detection system
2 couplable to a packet network, comprising:

3 a switching partition couplable to said packet network and
4 including:

5 line interface modules configured to provide an interface
6 to corresponding access nodes,

7 a call progress tone detector configured to perform call
8 progress tone detection analysis and generate an indication
9 thereof, and

10 an input-output distributor configured to employ a
11 circuit to interconnect said call progress tone detector and
12 a first of said line interface modules to allow said call
13 progress tone detector to perform said call progress tone
14 detection analysis with respect to said first of said line
15 interface modules; and

16 a main control unit configured to receive requests from an
17 application over said packet network, transmit call and control
18 processing commands to said switching partition, create an
19 interconnection between said first of said line interface modules
20 and a second of said line interface modules based on said
21 indication and notify said application of said interconnection.

2. The distributed call progress tone detection system as
2 recited in Claim 1 wherein said call progress tone detector
3 includes energy detection.

3. The distributed call progress tone detection system as
2 recited in Claim 1 wherein said call progress tone detector
3 includes energy detection with guard band elimination.

4. The distributed call progress tone detection system as
recited in Claim 1 wherein said call progress tone detector is
further configured to receive at least one tunable parameter and
adjust said call progress tone detection analysis on a call-by-call
basis thereof.

5. The distributed call progress tone detection system as
recited in Claim 4 wherein said at least one tunable parameter is
selected from the group consisting of:

- 4 a software answer detect time,
- 5 a hardware answer detect time,
- 6 a ring no answer time,
- 7 a minimum call answer time,
- 8 a recorded human speech detect time,
- 9 a maximum resource wait time, and
- 10 a pause wait time after speech detected.

6. The distributed call progress tone detection system as

2 recited in Claim 1 wherein said indication is selected from the

3 group consisting of:

4 a busy tone,

5 a reorder tone,

6 a ring back tone with no answer,

7 a human speech with answer quickly,

8 a human speech with pause detected after speech,

9 a recorded human speech,

10 a facsimile/modem,

11 a Telco Intercept, and

12 a no energy detected before answer detect time expired.

7. The distributed call progress tone detection system as

13 recited in Claim 1 wherein said line interface modules are

14 dynamically configurable via program downloads.

8. The distributed call progress tone detection system as

2 recited in Claim 1 wherein said call progress tone detector may be

3 embodied within at least one of said line interface modules.

9. The distributed call progress tone detection system as
2 recited in Claim 1 wherein said call progress tone detector may be
3 embodied within software downloaded to at least one of said line
4 interface modules.

10. The distributed call progress tone detection system as
2 recited in Claim 1 wherein said main control unit further notifies
3 said application of said indication.

11. The distributed call progress tone detection system as
recited in Claim 1 wherein said call and control processing
commands are selected from the group consisting of:

- a no answer supervision command,
- a use network answer supervision command,
- a best try full analysis command, and
- a full call progress analysis command.

12. The distributed call progress tone detection system as
2 recited in Claim 1 wherein said main control unit is further
3 configured to auto-terminate a call on said first of said line
4 interface modules if an access node coupled to said second of said
5 line interface modules is unavailable.

13. The distributed call progress tone detection system as
2 recited in Claim 12 wherein a timeout period, associated with an
3 availability of said access node, elapses before said main control
4 unit auto-terminates said call.

14. The distributed call progress tone detection system as
2 recited in Claim 1 further comprising said application and wherein
3 said application is selected from the group consisting of:

4 a non-predictive dialer,
5 a predictive dialer,
an answering machine dialer, and
a call center.

15. The distributed call progress tone detection system as
recited in Claim 14 wherein, upon receiving said notification from
said main control unit, said application is configured to transmit
information associated with said request to a terminal coupled to
a third of said line interface modules that is associated with said
5 second of said line interface modules.
6

16. The distributed call progress tone detection system as
2 recited in Claim 1 wherein said circuit is a circuit-switched
3 matrix configured to control and selectively interconnect said line
4 interface modules and said call progress tone detector.

17. A method of operating a distributed call progress tone

2 detection system couplable to a packet network, comprising:

3 receiving requests from an application over said packet
4 network and transmitting transmit call and control processing
5 commands to a switching partition via a main control unit;

6 providing an interface to corresponding access nodes via line
7 interface modules;

8 generating a call on a first of said line interface modules;

9 employing an input-output distributor to interconnect a call
10 progress tone detector and said first of said line interface
11 modules to allow said call progress tone detector to perform a call
12 progress tone detection analysis and generate an indication thereof
13 with respect to said first of said line interface modules; and

14 creating an interconnection between said first of said line
15 interface modules and a second of said line interface modules based
16 on said indication via said input-output distributor and notifying
17 said application of said interconnection.

18. The method as recited in Claim 17 wherein said call

2 progress tone detection analysis further includes performing energy
3 detection.

19. The method as recited in Claim 17 wherein said call
2 progress tone detection analysis further includes performing energy
3 detection with guard band elimination.

20. The method as recited in Claim 17 wherein said call
2 progress tone detection analysis further includes receiving at
3 least one tunable parameter and adjusting said call progress tone
4 detection analysis on a call-by-call basis thereof.

21. The method as recited in Claim 20 wherein said at least
one tunable parameter is selected from the group consisting of:

- a software answer detect time,
- a hardware answer detect time,
- a ring no answer time,
- a minimum call answer time,
- a recorded human speech detect time,
- a maximum resource wait time, and
- 9 a pause wait time after speech detected.

22. The method as recited in Claim 17 wherein said indication
2 is selected from the group consisting of:

- 3 a busy tone,
- 4 a reorder tone,
- 5 a ring back tone with no answer,

6 a human speech with answer quickly,
7 a human speech with pause detected after speech,
8 a recorded human speech,
9 a facsimile/modem,
10 a Telco Intercept, and
11 a no energy detected before answer detect time expired.

23. The method as recited in Claim 17 wherein said line
2 interface modules are dynamically configurable via program
3 downloads.

24. The method as recited in Claim 17 wherein said call
2 progress tone detector may be embodied within at least one of said
3 line interface modules.

25. The method as recited in Claim 17 wherein said call
2 progress tone detector may be embodied within software downloaded
3 to at least one of said line interface modules.

26. The method as recited in Claim 17 further comprising
2 notifying said application of said indication.

27. The method as recited in Claim 17 wherein said call and
2 control processing commands are selected from the group consisting
3 of:

4 a no answer supervision command,
5 a use network answer supervision command,
6 a best try full analysis command, and
7 a full call progress analysis command.

28. The method as recited in Claim 17 further comprising
auto-terminating a call on said first of said line interface
modules if an access node coupled to said second of said line
interface modules is unavailable.

29. The method as recited in Claim 28 wherein said auto-
terminating further includes elapsing a timeout period, associated
with an availability of said access node, before said auto-
terminating said call.

30. The method as recited in Claim 17 further comprising said
2 application and wherein said application is selected from the group
3 consisting of:

4 a non-predictive dialer,
5 a predictive dialer,
6 an answering machine dialer, and

7 a call center.

2 31. The method as recited in Claim 17 further comprising,
3 upon receiving said notification, transmitting information
4 associated with said request to a terminal coupled to a third of
5 said line interface modules that is associated with said second of
said line interface modules via said application.

2 32. The method as recited in Claim 17 wherein said
input-output distributor employs a circuit-switched matrix to
control and selectively interconnect said line interface modules
and said call progress tone detector.

33. A distributed call progress tone detection system

2 couplable to a packet network, comprising:

3 a switching partition means couplable to said packet network

4 and including:

5 line interface means that provides an interface to
6 corresponding access nodes,

7 a call progress tone detection means that performs call
8 progress tone detection analysis and generates an indication
9 thereof, and

10 an input-output distributor means that employs a circuit
means to interconnect said call progress tone detection means
11 and a first of said line interface means to allow said call
12 progress tone detection means to perform said call progress
13 tone detection analysis with respect to said first of said
14 line interface means; and

15 a main control unit means that receives requests from an
application means over said packet network, transmits call and
16 control processing commands to said switching partition means,
creates an interconnection between said first of said line
17 interface means and a second of said line interface means based on
18 said indication and notify said application means of said
19 interconnection.

34. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said call progress tone detection means
3 includes energy detection.

35. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said call progress tone detection means
3 includes energy detection with guard band elimination.

36. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said call progress tone detection means
further receives at least one tunable parameter and adjusts said
call progress tone detection analysis on a call-by-call basis
thereof.

37. The distributed call progress tone detection system as
2 recited in Claim 36 wherein said at least one tunable parameter is
3 selected from the group consisting of:

4 a software answer detect time,
5 a hardware answer detect time,
6 a ring no answer time,
7 a minimum call answer time,
8 a recorded human speech detect time,
9 a maximum resource wait time, and
10 a pause wait time after speech detected.

38. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said indication is selected from the
3 group consisting of:

4 a busy tone,
5 a reorder tone,
6 a ring back tone with no answer,
7 a human speech with answer quickly,
8 a human speech with pause detected after speech,
9 a recorded human speech,
10 a facsimile/modem,
11 a Telco Intercept, and
12 a no energy detected before answer detect time expired.

13 39. The distributed call progress tone detection system as
14 recited in Claim 33 wherein said line interface means are
15 dynamically configurable via program downloads.
16

17 40. The distributed call progress tone detection system as
18 recited in Claim 33 wherein said call progress tone detection means
19 is embodied within at least one of said line interface means.

41. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said call progress tone detection means
3 is embodied within software downloaded to at least one of said line
4 interface means.

42. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said main control unit means further
3 notifies said application means of said indication.

43. The distributed call progress tone detection system as
recited in Claim 33 wherein said call and control processing
commands are selected from the group consisting of:

- a no answer supervision command,
- a use network answer supervision command,
- a best try full analysis command, and
- a full call progress analysis command.

44. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said main control unit means also auto-
3 terminates a call on said first of said line interface means if an
4 access node coupled to said second of said line interface means is
5 unavailable.

2 45. The distributed call progress tone detection system as
3 recited in Claim 44 wherein a timeout period, associated with an
4 availability of said access node, elapses before said main control
unit means auto-terminates said call.

2 46. The distributed call progress tone detection system as
3 recited in Claim 33 further comprising said application means and
4 wherein said application means is selected from the group
consisting of:

5 a non-predictive dialer,
2 a predictive dialer,
3 an answering machine dialer, and
4 a call center.

2 47. The distributed call progress tone detection system as
3 recited in Claim 46 wherein, upon receiving said notification from
4 said main control unit means, said application means transmits
5 information associated with said request to a terminal coupled to
6 a third of said line interface means that is associated with said
second of said line interface means.

48. The distributed call progress tone detection system as
2 recited in Claim 33 wherein said circuit means is a
3 circuit-switched matrix means that controls and selectively
4 interconnects said line interface means and said call progress tone
5 detection means.

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49. An enterprise call center with call progress tone

2 detection coupled to a packet network, comprising:

3 switching partitions coupled to said packet network and

4 including:

5 line interface modules that provide an interface to
6 corresponding access nodes,

7 a call progress tone detector that performs call progress
8 tone detection analysis and generates an indication thereof,
9 and

10 an input-output distributor that employs a circuit to
11 interconnect said call progress tone detector and a first of
12 said line interface modules to allow said call progress tone
13 detector to perform said call progress tone detection analysis
14 with respect to said first of said line interface modules;

15 a primary main control unit associated with a first location
16 and coupled to said packet network; and

17 a secondary main control unit associated with a second
18 location and coupled to said packet network, at least one of said
19 primary and secondary main control units receiving requests from an
20 application over said packet network, transmitting call and control
21 processing commands to at least one of said switching partitions,
22 creating an interconnection between said first of said line
23 interface modules and an agent coupled to one of said line
24 interface modules in one of said switching partitions based on said

25 indication and notifying said application of said interconnection.

50. The enterprise call center as recited in Claim 49 wherein
2 said call progress tone detector includes energy detection.

51. The enterprise call center as recited in Claim 49 wherein
2 said call progress tone detector includes energy detection with
3 guard band elimination.

52. The enterprise call center as recited in Claim 49 wherein
said call progress tone detector further receives at least one
tunable parameter and adjusts said call progress tone detection
analysis on a call-by-call basis thereof.

53. The enterprise call center as recited in Claim 52 wherein
said at least one tunable parameter is selected from the group
consisting of:

- 4 a software answer detect time,
- 5 a hardware answer detect time,
- 6 a ring no answer time,
- 7 a minimum call answer time,
- 8 a recorded human speech detect time,
- 9 a maximum resource wait time, and
- 10 a pause wait time after speech detected.

54. The enterprise call center as recited in Claim 49 wherein

2 said indication is selected from the group consisting of:

3 a busy tone,

4 a reorder tone,

5 a ring back tone with no answer,

6 a human speech with answer quickly,

7 a human speech with pause detected after speech,

8 a recorded human speech,

9 a facsimile/modem,

a Telco Intercept, and

a no energy detected before answer detect time expired.

55. The enterprise call center as recited in Claim 49 wherein

2 said line interface modules are dynamically configurable via
3 program downloads.

56. The enterprise call center as recited in Claim 49 wherein

2 said call progress tone detector may be embodied within at least
3 one of said line interface modules.

57. The enterprise call center as recited in Claim 49 wherein

2 said call progress tone detector may be embodied within software
3 downloaded to at least one of said line interface modules.

58. The enterprise call center as recited in Claim 49 wherein
2 said at least one of said primary and secondary main control units
3 further notifies said application of said indication.

59. The enterprise call center as recited in Claim 49 wherein
2 said call and control processing commands are selected from the
3 group consisting of:

4 a no answer supervision command,
5 a use network answer supervision command,
6 a best try full analysis command, and
7 a full call progress analysis command.

60. The enterprise call center as recited in Claim 49 wherein
1 said at least one of said primary and secondary main control units
2 further auto-terminates a call on said first of said line interface
3 modules if all of said line interface modules, in each of said
4 switching partitions, associated with agents are unavailable.
5

61. The enterprise call center as recited in Claim 60 wherein
2 a timeout period, associated with an availability of said agents,
3 elapses before said at least one of said primary and secondary main
4 control units auto-terminates said call.

2 62. The enterprise call center as recited in Claim 49 further
3 comprising said application and wherein said application is
4 selected from the group consisting of:

5 a non-predictive dialer,
6 a predictive dialer,
7 an answering machine dialer, and
8 a call center.

2 63. The enterprise call center as recited in Claim 62
3 wherein, upon receiving said notification from said main control
4 unit, said application transmits information associated with said
5 request to a terminal coupled to another of said line interface
6 modules in said one of said switching partitions that is associated
7 with said agent coupled to said one of said line interface modules
8 in said one of said switching partitions.

2 64. The enterprise call center as recited in Claim 49 wherein
3 said circuit is a circuit-switched matrix that controls and
4 selectively interconnects said line interface modules and said call
5 progress tone detector.